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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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10/798,132

03/11/2004

Tomoyuki Kubo

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01/26/2006

REED SMITH, LLP

ATTN: PATENT RECORDS DEPARTMENT

599 LEXINGTON AVENUE, 29TH FLOOR

NEW YORK, NY 10022-7650

EXAMINER

GARCIA JR, RENE

ART UNIT

PAPER NUMBER

2853

DATE MAILED: 01/26/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/798,132

Applicant(s)

KUBO, TOMOYUKI

Examiner

Rene Garcia, Jr.

Art Unit

2853

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☐ Responsive to communication(s) filed on ____.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-16 is/are pending in the application.
- 4a) Of the above claim(s) ____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) ____ is/are allowed.
- 6) ☒ Claim(s) 1-5, 7 and 12-16 is/are rejected.
- 7) ☒ Claim(s) 8-11 is/are objected to.
- 8) ☐ Claim(s) ____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☒ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 11 March 2004 is/are: a) ☐ accepted or b) ☒ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. ____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date 11 March 2004.
- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. ____.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: ____.

DETAILED ACTION

Drawings

1. The drawings are objected to under 37 CFR 1.83(a). The drawings must show every feature of the invention specified in the claims. Therefore, the void portion opposed to said head unit included in heatsink must be shown or the feature(s) canceled from the claim(s). No new matter should be entered.

Corrected drawing sheets in compliance with 37 CFR 1.121(d) are required in reply to the Office action to avoid abandonment of the application. Any amended replacement drawing sheet should include all of the figures appearing on the immediate prior version of the sheet, even if only one figure is being amended. The figure or figure number of an amended drawing should not be labeled as "amended." If a drawing figure is to be canceled, the appropriate figure must be removed from the replacement sheet, and where necessary, the remaining figures must be renumbered and appropriate changes made to the brief description of the several views of the drawings for consistency. Additional replacement sheets may be necessary to show the renumbering of the remaining figures. Each drawing sheet submitted after the filing date of an application must be labeled in the top margin as either "Replacement Sheet" or "New Sheet" pursuant to 37 CFR 1.121(d). If the changes are not accepted by the examiner, the applicant will be notified and informed of any required corrective action in the next Office action. The objection to the drawings will not be held in abeyance.

2. The drawings are objected to under 37 CFR 1.83(a) because they fail to show "two opposed or void portions which are opposed to the respective two head units". Any structural detail that is essential for a proper understanding of the disclosed invention should be shown in

the drawing. MPEP § 608.02(d). Corrected drawing sheets in compliance with 37 CFR 1.121(d) are required in reply to the Office action to avoid abandonment of the application. Any amended replacement drawing sheet should include all of the figures appearing on the immediate prior version of the sheet, even if only one figure is being amended. The figure or figure number of an amended drawing should not be labeled as "amended." If a drawing figure is to be canceled, the appropriate figure must be removed from the replacement sheet, and where necessary, the remaining figures must be renumbered and appropriate changes made to the brief description of the several views of the drawings for consistency. Additional replacement sheets may be necessary to show the renumbering of the remaining figures. Each drawing sheet submitted after the filing date of an application must be labeled in the top margin as either "Replacement Sheet" or "New Sheet" pursuant to 37 CFR 1.121(d). If the changes are not accepted by the examiner, the applicant will be notified and informed of any required corrective action in the next Office action. The objection to the drawings will not be held in abeyance.

3. The drawings are objected to as failing to comply with 37 CFR 1.84(p)(4) because reference characters "44" and "45" have both been used to designate "flexible wiring board portion" (fig. 2; 44 and 45 point to same object within the drawing). Corrected drawing sheets in compliance with 37 CFR 1.121(d) are required in reply to the Office action to avoid abandonment of the application. Any amended replacement drawing sheet should include all of the figures appearing on the immediate prior version of the sheet, even if only one figure is being amended. Each drawing sheet submitted after the filing date of an application must be labeled in the top margin as either "Replacement Sheet" or "New Sheet" pursuant to 37 CFR 1.121(d). If the changes are not accepted by the examiner, the applicant will be notified and informed of any

required corrective action in the next Office action. The objection to the drawings will not be held in abeyance.

Claim Objections

4. Claim 3 is objected to as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention. Claim 1 includes the limitation of a heatsink having a void portion which is opposed to said head unit, however in claim 3 the limitations further includes void portion including an aperture formed through said heatsink. Examiner is of the position that a void can not have an aperture being that a void is considered to be opening, gap; empty space; the quality or state of being without something (Merriam Webster's Collegiate Dictionary Tenth Edition 1997; page 1323), it is not physically possible to have an aperture in a void portion.

5. Claim 4 is objected to as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention. Claim 1 includes the limitation of a heatsink having a void portion which is opposed to said head unit, however in claim 4 the limitations further includes void portion including a plurality of holes formed through said heatsink. Examiner is of the position that a void can not have a hole being that a void is considered to be: opening, gap; empty space; the quality or state of being without something (Merriam Webster's Collegiate Dictionary Tenth Edition 1997; page 1323), it is not physically possible to have an hole(s) in a void portion.

Claim Rejections - 35 USC § 102

6. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

7. Claims 1 and 3 are rejected under 35 U.S.C. 102(e) as being anticipated by Drury et al. (US 2003/0150931).

Drury et al. disclose the following claimed limitations:

*regarding claims 1 and 3, recording apparatus comprising:

*head unit/**droplet ejection module, 100/** (fig. 1) including an actuator/**118/** (fig. 2)

which generates energy required for recording predetermined patterns of image on a recording medium (paragraph 0004-0008)

*circuit board/**drive circuitry, 130/** including a driver element which drives said actuator/**118/** of said head unit/**100/** (fig. 4 and 5; paragraph 0070 and 0013)

*heatsink/**160/** (fig. 7) disposed in thermally conductive communication with said driver element (paragraph 0074)

*wherein said heatsink/**160/** has a void portion/**hollow/** (paragraph 0074) which is opposed to said head unit/**100/** (hollow portion within heatsink which is opposed to head unit)

*With respect to claim 3, aperture and void are understood to be one in the same.

Claim Rejections - 35 USC § 103

8. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

9. Claims 2 and 7 are rejected under 35 U.S.C. 103(a) as being unpatentable over Drury et al. (US 2003/0150931) in view of Isono et al. (US 6,604,817).

Drury et al. disclose the following claimed limitations:

*regarding claim 2, head unit/droplet ejection module, 100/ further includes a cavity unit/ink supply manifold, 150/ (figs. 6 and 7) which stores an ink in cavities formed therein (paragraph 0073)

Drury et al. does not disclose the following claimed limitations:

*regarding claim 2, actuator is a piezoelectric actuator which is superposed on said cavity unit and which is operable to eject the ink onto the recording medium

*regarding claim 7, cavity unit of said head unit has a surface which is to be opposed to the recording medium, and a plurality of nozzle holes which are held in communication with the respective cavities of said cavity unit and which are open in said surface

Isono et al. discloses the following:

*regarding claim 2, actuator is a piezoelectric actuator/20/ which is superposed on said cavity unit/cavity plate, 10/ and which is operable to eject the ink onto the recording medium (fig. 1; col. 6, lines 52-58) for the purpose of making the print head smaller and cheaper without increasing the number of places where ink may leak

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*regarding claim 7, cavity-unit/**cavity plate, 10/** of said head unit/**print head/** has a surface/**nozzle plate, 11/** which is to be opposed to the recording medium, and a plurality of nozzle holes/**nozzles, 15/** which are held in communication with the respective cavities of said cavity unit/**cavity plate, 10/** and which are open in said surface/**nozzle plate, 11/** (figs. 5 and 6; col. 6, lines 59-67) for the purpose of ejection of ink

It would have been obvious at the time the invention was made to a person having ordinary skill in the art to utilize an actuator is a piezoelectric actuator which is superposed on said cavity unit and which is operable to eject the ink onto the recording medium; and cavity unit of said head unit has a surface which is to be opposed to the recording medium, and a plurality of nozzle holes which are held in communication with the respective cavities of said cavity unit and which are open in said surface as taught by Isono et al. into Drury et al. for the purpose of making the print head smaller and cheaper without increasing the number of places where ink may leak; and ejection of ink

10. Claims 4 and 12-14 are rejected under 35 U.S.C. 103(a) as being unpatentable over Drury et al. (US 2003/0150931) in view of Hilton et al. (US 6,655,785).

Drury et al. disclose the following claimed limitations:

*regarding claim 14, recording apparatus comprising:

*plurality of head units/**droplet ejection module, 100/** (fig. 1) each including an actuator/**118/** (fig. 2) which generates energy required for recording predetermined patterns of image on a recording medium (paragraph 0004-0008)

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*plurality of circuit boards/**drive circuitry, 130/** each including a driver element which drives said actuator/**118/** of a corresponding one of said head units/**droplet ejection module, 100/** (fig. 4 and 5; paragraph 0070 and 0008 and 0013)

*heatsink/**160/** (fig. 7) disposed in thermally conductive communication with said respective driver elements (paragraph 0074)

*regarding claim 12, circuit board/**printed wiring member, 314/** is disposed between said heatsink/**304/** and said head unit/**ink jet assembly, 312/** (fig. 10; col. 7, lines 45-60)

Drury et al. does not disclose the following claimed limitations:

*regarding claim 4, void portion of said heatsink includes a plurality of holes formed through said heatsink

*regarding claim 13, aperture is open at one edge of said heatsink

*regarding claim 14, wherein said heatsink has a plurality of void portions which are opposed to the respective head units

Hilton et al. discloses the following:

*regarding claim 4, void portion of said heatsink/**304/** includes a plurality of holes formed through said heatsink (fig. 10; holes) for the purpose of mounting ink manifold member/**302/** to the heat sink

*With respect to claim 4, void portion and holes are considered to be one in the same

*regarding claim 13, aperture (fig. 10; holes) is open at one edge of said heatsink/304/ for the purpose of mounting ink manifold member/302/ to the heat sink

*regarding claim 14, wherein said heatsink/304/ has a plurality of void portions (fig. 10; holes) which are opposed to the respective head units/ink jet assembly, 312/ (col. 7, line 45- col.8, line 7) for the purpose of mounting ink manifold member/302/ to the heat sink

It would have been obvious at the time the invention was made to a person having ordinary skill in the art to utilize a void portion of said heatsink includes a plurality of holes formed through said heatsink; aperture is open at one edge of said heatsink; and heatsink that has a plurality of void portions which are opposed to the respective head units as taught by Hilton et al. into Drury et al. for the purpose of mounting ink manifold assembly to the heat sink

11. Claim 5 is rejected under 35 U.S.C. 103(a) as being unpatentable over Drury et al. (US 2003/0150931) in view of Teung (US 6,945,638).

Drury et al. disclose all the claimed limitations except for the following:

*regarding claim 5, heat dissipation member disposed in thermally conductive communication with said head unit and spaced apart from said heatsink, so as to dissipate heat from said head unit

Teung et al. discloses the following:

*regarding claim 5, heat dissipation member/second ultimate heatsink, 590/ disposed in thermally conductive communication with said head unit/dispensing structure, 550/ and spaced apart from said heatsink/heatsink conduit, 580/ so as to dissipate heat from said head unit/550/

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(figs. 5 and 6; col. 6, lines 22- 58; col. 7, lines 23-34) for the purpose of reducing heat from the dispensing structure

It would have been obvious at the time the invention was made to a person having ordinary skill in the art to utilize a heat dissipation member disposed in thermally conductive communication with said head unit and spaced apart from said heatsink, so as to dissipate heat from said head unit as taught by Teung et al. into Drury et al. for the purpose of reducing heat from the dispensing structure

12. Claim 6 is rejected under 35 U.S.C. 103(a) as being unpatentable over Drury et al. (US 2003/0150931) as modified by Teung (US 6,945,638), as applied to claim 5 above and further in view of Sugiyama (US 6,339,444).

Drury et al. as modified by Teung disclose all the claimed limitations except for the following:

*regarding claim 6, circuit board further includes a wiring board portion which has an end portion superposed on said one head unit

*wherein heat dissipation member is superposed on said end portion of said wiring board portion of said circuit board, such that said heat dissipation member is opposed to said head unit, with said end portion of said wiring board portion being interposed between said heat dissipation member and said head unit

Sugiyama disclose the following:

*regarding claim 6, circuit board further includes a wiring board portion/**wiring substrate, 2595/** which has an end portion superposed on said one head unit/**thermal head**

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substrate, 2552/ (figs. 24 and 25) for the purpose of securing thermal head substrate and wiring board to the heatsink and pull heat away from head unit

*wherein heat dissipation member/**heatsink, 2551/** is superposed on said end portion of said wiring board portion/**2595/** of said circuit board/**2552/**, such that said heat dissipation member/**2551/** is opposed to said head unit/**2552/**, with said end portion of said wiring board portion/**2595/** being interposed between said heat dissipation member/**2551/** and said head unit/**2552/** (fig. 24 and 25) for the purpose of securing thermal head substrate and wiring board to the heatsink and pull heat away from head unit

It would have been obvious at the time the invention was made to a person having ordinary skill in the art to utilize a circuit board further includes a wiring board portion which has an end portion superposed on said one head unit, wherein heat dissipation member is superposed on said end portion of said wiring board portion of said circuit board, such that said heat dissipation member is opposed to said head unit, with said end portion of said wiring board portion being interposed between said heat dissipation member and said head unit as taught by Sugiyama into Drury et al. as modified by Teung for the purpose of securing thermal head substrate and wiring board to the heatsink and pull heat away from head unit

13. Claim 15 is rejected under 35 U.S.C. 103(a) as being unpatentable over Drury et al. (US 2003/0150931) as modified by Hilton et al. (US 6,655,785), as applied to claim 14 above and further in view of Sugiyama (US 6,339,444).

Drury et al. as modified by Hilton et al. disclose all the claimed limitations except for the following:

*regarding claim 15, aperture overlaps at least a portion of a corresponding one of said head units as viewed in a direction in which said void portions of said heatsink and said head units are opposed to each other

Sugiyama disclose the following:

*regarding claim 15, aperture/hole/ (fig. 25) overlaps at least a portion of a corresponding one of said head units/thermal head substrate, 2552/ (fig. 24 and 25) as viewed in a direction in which said void portions/holes/ of said heatsink/2551/ and said head units are opposed to each other

It would have been obvious at the time the invention was made to a person having ordinary skill in the art to utilize an aperture overlaps at least a portion of a corresponding one of said head units as viewed in a direction in which said void portions of said heatsink and said head units are opposed to each other as taught by Sugiyama into Drury et al. as modified by Hilton et al. for the purpose of securing thermal head substrate to the heatsink

14. Claim 16 is rejected under 35 U.S.C. 103(a) as being unpatentable over Drury et al. (US 2003/0150931) in view of Baxter (US 2004/0021721).

Drury et al. disclose the following claimed limitations:

*regarding claim 16, recording apparatus comprising:

*head unit/droplet ejection module, 100/ (fig. 1) including a cavity unit/ink supply manifold, 150/ (fig. 6 and 7) which stores an ink (paragraph 0073), and an actuator/118/ (fig. 2)

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which is operable to eject the ink onto a recording medium and which is superposed on said cavity unit/150/

*body frame/droplet ejection module, 100/ to which said head unit is attached, said body frame having a bottom plate portion/piezoelectric layers, 104 and 106/ (fig. 2) formed with an ink supply passage/fluid channel, 112/ which communicates with said cavity unit/150/ *circuit board/drive circuitry, 130/ overlying said actuator/118/ and including a driver element which drives said actuator/118/ (paragraph 0013 and 0070)

Drury et al. does not disclose the following claimed limitations:

*regarding claim 16, heatsink including a horizontally extending plate portion and a vertically extending plate portion, and disposed in thermally conductive communication with said driver element, said horizontally extending plate portion extending along said bottom plate portion of said body frame and having an aperture opposed to said head unit, and said vertically extending plate portion extending vertically from said horizontally extending plate portion

Baxter disclose the following:

*regarding claim 16, heatsink/9/ including a horizontally extending plate/copper block, 10/ portion and a vertically extending plate portion/wing region, 12/, and disposed in thermally conductive communication with said driver element/array, 3/ (ink jet nozzles), said horizontally extending plate portion/10/ extending along said bottom plate portion of said body frame and having an aperture opposed to said head unit/3/, and said vertically extending plate portion/12/ extending vertically from said horizontally extending plate portion/10/ (figs. 2 and 3; paragraphs 0021, 0023, 0025, and 0029)

It would have been obvious at the time the invention was made to a person having ordinary skill in the art to utilize a heatsink including a horizontally extending plate portion and a vertically extending plate portion, and disposed in thermally conductive communication with said driver element, said horizontally extending plate portion extending along said bottom plate portion of said body frame and having an aperture opposed to said head unit, and said vertically extending plate portion extending vertically from said horizontally extending plate portion as taught by Baxter into Drury et al. for the purpose of increasing overall thermal capacity of the heat sink to maintain thermal stability [of the nozzles]

Allowable Subject Matter

15. Claims 8-11 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

The following is a statement of reasons for the indication of allowable subject matter:

The primary reason for the allowance of claim 8 is the inclusion of the limitations being for a recording apparatus including a circuit board further includes a wiring board portion which extends along an outside surface of said bottom plate portion of said body frame from said head unit toward a periphery of said body frame; heatsink includes a horizontally extending plate portion which has said void portion and which is interposed between said bottom plate portion of said body frame and said wiring board portion of said circuit board. It is these limitations found in each of the claims, as they are claimed in the combination, that has not been found, taught or suggested by the prior art of record which makes these claims allowable over the prior art.

The primary reason for the allowance of claim 10 is the inclusion of the limitations being for a recording apparatus including a circuit board further includes a wiring board portion which extends along an outside surface of said bottom plate portion of said body frame from said one head unit toward a periphery of said body frame; driver element is disposed on said wiring board portion; heatsink includes a horizontally extending plate portion which has said void portion and which is disposed on one of opposite sides of said wiring board portion remote from said driver element. It is these limitations found in each of the claims, as they are claimed in the combination, that has not been found, taught or suggested by the prior art of record which makes these claims allowable over the prior art.

The primary reason for the allowance of claim 11 is the inclusion of the limitations being for a recording apparatus including a body frame further includes a back plate portion extending vertically from said bottom plate portion, wherein said heatsink includes a horizontally extending plate portion which has said void portion and which extends along an outside surface of said bottom plate portion of said body frame; circuit board including said driver element extends along said horizontally extending plate portion of said heatsink; heatsink further includes a vertically extending plate portion which extends along an outside surface of said back plate portion of said body frame. It is these limitations found in each of the claims, as they are claimed in the combination, that has not been found, taught or suggested by the prior art of record which makes these claims allowable over the prior art.

Conclusion

16. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. Drake (US 5,017,941) includes a thermal ink jet printhead with a cooling system

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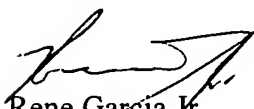
including a void portion. John (US 5,258,781) includes a thermal ink jet printhead with a heatsink in thermal contact with printhead die used to cool printhead.

Communications with the USPTO

17. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Rene Garcia, Jr. whose telephone number is (571) 272-5980. The examiner can normally be reached on M-F 8:00AM - 4:30PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Stephen D. Meier can be reached on (571) 272-2149. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).


Rene Garcia Jr
19 January 2006

 1/06
K. FEGGINS
PRIMARY EXAMINER